REMARKS

As suggested in the Official Action, Figure 7 has been corrected to include the designation "Prior Art". Also as suggested, the phrase "average particle diameter" was changed to "average pore diameter" at page 14, line 28. The same change was also made at page 16, line 9, and in claim 8. Another typographical error was also corrected at page 25, lines 7-8.

The Examiner pointed out that Claims 1, 3-4, 6-7, 9-10, 12-13, 15-16, and 18-19 are rejected as being unpatentable over JP 11-162787 (Kazuya) and JP 2001-307966 (Takeshi); Claims 2, 11, and 14 are rejected as being unpatentable over Kazuya, Takeshi, and U.S. Patent No. 6359769 (Mushiake); Claims 5 and 17 are rejected as being unpatentable over Kazuya, Takeshi, and Dow Reichhold Specialty Latex; and Claim 8 is rejected as being unpatentable over Kazuya, Takeshi, Mushiake and U.S. Patent No. 6021039 (Inagawa).

The present amendment amends the independent Claims 1, 11 and 13 in order to overcome the obviousness rejections. In the amended claims, it is made clear that the carbon materials in the conductive intermediate layer (or the conductive adhesive) are a carbon black and a platelet-like graphite as originally defined in Claim 2, 3, 14, 15; and as discussed at page 11 lines 1-14; page 13 lines 9-24; and Figure 2. Further, in these amended Claims, the ratio of the carbon black and the platelet-like graphite are added, support being found at page 12 line 4 and Working Examples. In all Working Examples, 75 mass % of scale-like graphite (platelet-like graphite) and 25 mass % of acetylene black (carbon black) were used and this ratio (75 mass %: 25 mass % = 3:1) is the ground of the lower limit, although the lower limit (1:3) in the amended Claims are not directly described in page 12 line 4.

The feature of the electrode for electric double layer capacitor of the claimed invention is that the conductive intermediate (adhesive) layer comprises the carbon black having small diameter and the platelet-like graphite having large diameter with specific ratio (platelet-like-graphite rich ratio), and the polarizable porous sheet is integrated onto the collector via the conductive intermediate (adhesive) layer (Claims 1, 11, and 13).

According to the claimed invention, some of the small carbon black can enter

into the holes of the polarizable porous sheet, and large platelet-like graphite and the remain of the small carbon black stay in the intermediate (adhesive) layer (Figure 2). This specific distribution of the small carbon black and the large platelet-like graphite contribute the lowering internal resistance of the electrode (page 11 lines 15-25). Especially the large platelet-like-graphite-rich ratio can further lower internal resistance of the electrode (page 12 lines 4-7).

Kazuya (JP 11-162787) discloses the electrochemical capacitor wherein the electrode part forming sheet is bound to the current collector sheet by the conductive adhesive (Claims 1 and 2). The conductive adhesive contains filler such as carbon type powder (e.g. carbon black, graphite carbon whisker), and the metal powder (e.g. silver powder, copper powder, aluminum powder (in [0033]). However, Kazuya is silent for the combination of the small carbon black and the large platelet-like graphite and the ratio of those.

Takeshi (JP 2001-307966) discloses the electric double-layer capacitor produced by binding the electrode with the current collector through the carbonic conductive layer containing the binder component (Claim 1). Takeshi also discloses the combination of graphite microparticles and carbon black in the conductive adhesive and weight ratio is 1:1 in [0034], [0038], and [0040]. However, the shape of graphite of Takeshi is not platelet-like but microparticle, and the ratio is not graphite rich. Therefore, Takeshi is also silent for the combination of the small carbon black and the large platelet-like graphite and the ratio of those.

Mushiake (U.S. Patent No. 6359769) discloses the polarizable electrode assembly comprising the polarizable electrode, the collector layer, and the adhesive for attaching those (Claim 1). The adhesive comprising electrically conductive carbon (Claim 1), and the electrically conductive carbon is graphite or carbon black (Claim 3). However, Mushiake says that the graphite or carbon black has the same average particle size (0.5 to 50 microns) (column 4 lines 53-54). Further, Mushiake does not combine the carbon black and graphite. Therefore, Mushiake is also silent for the combination of the small carbon black and the large platelet-like graphite and the ratio of those.

Dow Reichhold Specialty Latex discloses the styrene-butadiene rubber but is

silent for the combination of the small carbon black and the large platelet-like graphite and the ratio of those.

Inagawa (U.S. Patent No. 6021039) discloses the basic cell for electric double-layer capacitor comprising a pair of polarizable electrodes and a pair of collectors (Claim 1). However, Inagawa does not disclose the means for adhering the electrodes to the collectors. Therefore, Inagawa is also silent for the combination of the small carbon black and the large platelet-like graphite and the ratio of those.

As described above, all Cited References are silent for some feature of the claimed invention, such as the combination of the small carbon black and the large platelet-like graphite and the ratio of those. It is true that Takeshi discloses the combination of graphite and carbon black, but Takeshi's graphite is microparticle. Although the Official Action states that it is known in the art that graphite has large diameter, Takeshi's graphite is microparticle, there is no reason showing microparticle means large diameter, and at least Takeshi's graphite is not platelet-like shape. None of the Cited References teach or suggest the combination of platelet-like graphite and carbon black. Furthermore, another feature of our invention is the ratio of the platelet-like graphite to carbon black (platelet-graphite rich). This feature of the claimed invention is not definitely suggested or motivated from the cited references.

In addition, according to the claimed invention, the combination of the platelet-like graphite and carbon black and the specific ratio (platelet-like-graphite-rich ratio) contribute to the lowering internal resistance of the electrode (page 11 lines 15-25), and this effect of the invention could not be predict from cited references. Attached herewith is a Declaration under 37 CFR 1.132. The Declaration shows the relation between volume resistivity of the conductive adhesive and the weight ratio of platelet-like graphite to carbon black (following Table I).

Table I

weight ratio (carbon black : platelet-like graphite)	volume resistivity (ohm·cm)
1 : 0	0.4
1 : 1	0.084
1 : 2	0.07
1 : 3	0.074
0 : 1	0.24

As shown above Table I, the combination of carbon black and plate-let like graphite contributes to lowering the volume resistivity and the ratio of the carbon black and plate-let like graphite from 1:2 to 1:3 is the best effect in lowering the volume resistivity. Even when the ratio from 1:2 to 1:3 is compared to the ratio of 1:1, volume resistivity is lowered by 16% (=(0.084-0.07)/0.084) or 11% (=(0.084-0.074)/0.084). The reduction of volume resistivity by more than 10% is extremely valuable effect and can reduce the internal resistance of electrode as described in the Declaration. This effect is not predicted from any cited references which do not disclose even the combination of the carbon black and platelet-like graphite.

As described above, the claimed invention is not motivated from the cited references and the effect of the claimed invention is not predicted from the cited references. Therefore, it is submitted that the claimed invention is not obvious. Reconsideration is respectfully requested.

Respectfully submitted,

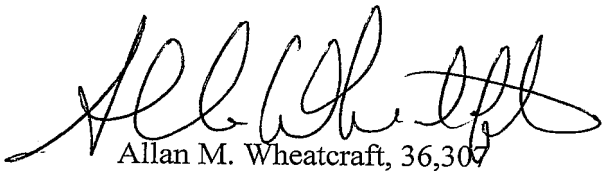

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FIG.6

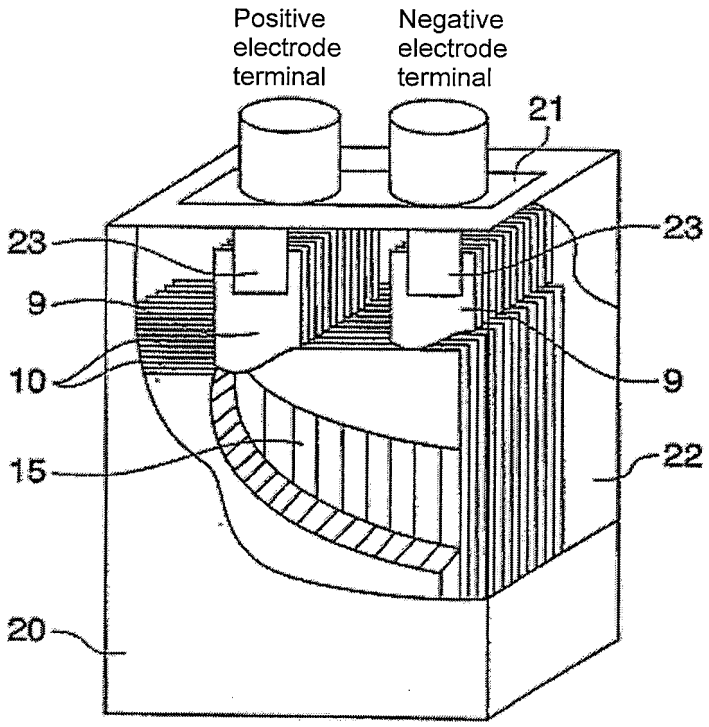
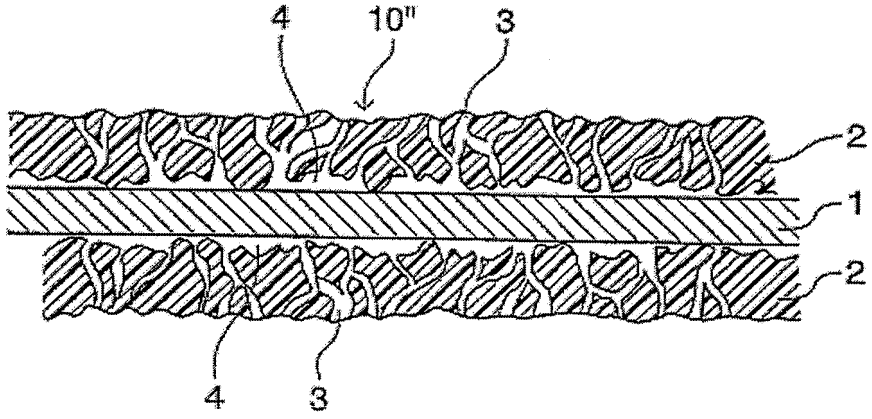


FIG.7



PRIOR ART